What is claimed is:

1. A method of manufacturing a mirror having a reflection surface vertical to the surface of a silicon substrate comprising;

a step of forming a mask for forming a mask material to the surface of the substrate, an anisotropic dry etching step of anisotropically dry etching the substrate, and an anisotropic wet etching step of anisotropically wet etching the substrate, and forming a surface substantially parallel with a crystal face in perpendicular to the surface of the substrate by the anisotropic dry etching step and then forming the reflection surface by the anisotropic wet etching step.

2. A method of manufacturing a mirror according to claim 1, wherein an angle formed between a portion of a fabrication side wall formed to the substrate at least corresponding to the reflection surface and the surface of the substrate is 90° ± 3° in the anisotropic dry etching step.

3. A method of manufacturing a mirror according to claim 1, wherein the surface roughness for the portion of the fabricated side wall formed to the substrate at least corresponding to the reflection surface is 300 nm or less in the anisotropic dry etching step.

4. A method of manufacturing a mirror according to claim 1, wherein a silicon exposed portion is provided to the outer periphery of the substrate in the anisotropic dry etching

step.

5. A method of manufacturing a mirror according to claim 1, wherein a cleaning step is included between the anisotropic dry etching step and the anisotropic wet etching step.

6. A method of manufacturing a mirror according to claim 5, wherein oxygen plasma is irradiated to the substrate in the cleaning step.

7. A method of manufacturing a mirror according to claim 5, wherein argon plasma is irradiated to the substrate in the cleaning step.

8. A method of manufacturing a mirror according to claim 5, wherein the substrate is immersed in a liquid mixture of sulfuric acid and an aqueous hydrogen peroxide in the cleaning step.

9. A method of manufacturing a mirror according to claim 5, wherein the substrate is immersed in a heated sulfuric acid in the cleaning step.

10. A method of manufacturing a mirror according to claim 1, wherein the etchant is an aqueous solution of potassium hydroxide in the anisotropic wet etching step.

11. A method of manufacturing a mirror according to claim 1, wherein the etchant is potassium hydroxide with addition of isopropyl alcohol in the anisotropic wet etching step.

12. A method of manufacturing a mirror according to

claim 1, wherein the etchant is tetramethyl ammonium hydroxide in the anisotropic wet etching step.

13. A method of manufacturing a mirror according to claim 12, wherein the etchant is tetramethyl ammonium hydroxide in the anisotropic wet etching step, and the liquid temperature is 60°C or higher and 70°C or lower.

14. A method of manufacturing a mirror according to claim 12, wherein the etchant is an aqueous solution of tetramethyl ammonium hydroxide in the anisotropic wet etching step, and the etching amount is 0.5 μm or more and 3 μm or less.

15. A method of manufacturing a mirror according to claim 1, wherein the etchant is tetramethyl ammonium hydroxide with addition of silicon in the anisotropic wet etching step.

16. A method of manufacturing a mirror according to claim 1, wherein the etchant is tetramethyl ammonium hydroxide with addition of silicon and ammonium persulfate in the anisotropic wet etching step.

17. A method of manufacturing a mirror according to claim 1, wherein the etchant is ammonia with addition of arsenic oxide in the anisotropic wet etching step.

18. A method of manufacturing a mirror according to claim 1, wherein the crystal face on the surface of the substrate is {100} face, and the crystal face as the reflection surface is {100} face or {110} face.

19. A method of manufacturing a mirror according to

claim 1, wherein the crystal face in the surface of the substrate is {110} face, and the crystal face as the reflection surface is {100} face, {110} face, or {111} face.

20. A method of manufacturing a mirror according to claim 1, wherein the crystal face in the surface of the substrate is {111} face, and the crystal face as the reflection surface is {110} face.

21. A method of manufacturing a mirror according to claim 1, including a step of coating a thin film on the reflection surface.

22. A method of manufacturing a mirror according to claim 21, wherein the thin film is formed of at least one layer of a metal film in the step of coating the thin film on the reflection surface.

23. A method of manufacturing a mirror according to claim 21, wherein the thin film is formed of at least one layer of a dielectric material in the step of coating the thin film on the reflection surface.

24. A method of manufacturing a mirror according to claim 1, wherein the film deposition method for the thin film is an oblique vapor deposition method using a vacuum vapor deposition method in the step of coating the thin film on the reflection surface.

25. A method of manufacturing a mirror according to claim 1, wherein the film deposition method for the thin film

is a sputtering method in the step of coating the thin film on the reflection surface.

26. A method of manufacturing a mirror according to claim 1, wherein the film deposition method for the thin film is a plating method in the step of coating the thin film on the reflection surface.

27. A method of manufacturing a mirror according to claim 1, wherein the film deposition method for the thin film is an ion plating method in the step of coating the thin film on the reflection surface.

28. A mirror device formed on a substrate, having at least two reflection surfaces each comprising a surface vertical to the surface of the substrate, in which the angle formed by the at least two reflection surfaces is 90°, and which is manufactured by the mirror manufacturing method according to claim 1.

29. A mirror device according to claim 28, wherein the two reflection surfaces formed to the substrate are identical crystal faces.

30. An optical switch comprising two sets of movable retro reflectors, two sets of fixed retro reflectors, fixing portions integral with the fixed retro reflectors, movable portions integral with the movable retro reflectors, and springs for connecting the fixed portions and the movable portions, which is adapted to switch optical channels by driving the

movable portion and in which the movable retro reflector and the fixed retro reflector are prepared by the method of manufacturing mirror according to claim 1.

31. A method of manufacturing an optical switch comprising a step of forming a retro reflector of preparing movable retro reflectors, fixed retro reflectors, movable portions and fixed portions to a substrate and a step of forming springs, wherein the movable retro reflector and the fixed retro reflector are prepared by the method of manufacturing the mirror according to claim 1.

32. A method of manufacturing an optical switch according to claim 31, wherein the spring forming step is conducted after the retro reflector forming step.

33. A method of manufacturing an optical switch according to claim 31, wherein the substrate is an SOI substrate, and the retro reflector forming step is conducted to one silicon layer and the spring forming step is conducted to the other silicon layer.